EXP:7

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EXAMINING NETWORK ADDRESS TRANSLATION(NAT) USING CISCO PACKET TRACER

Aim:

Examining Network Address Translation (NAT) using Cisco Packet Tracer involves several steps. NAT is commonly used to allow multiple devices on a local network to share a single public IP address for accessing the internet. Here's how you can set up and examine NAT using Cisco Packet Tracer

1. Setting Up the Network Topology

- **Devices Required:**

    1. Two PCs (for testing connectivity)

    2. Two router (to configure NAT)

    3. Two switch (to connect the PCs and the router)

   4. One server (to simulate an external network, like the internet)

- **Steps:**

    1. **Place the Devices:** Drag and drop the required devices onto the workspace.

    2. **Connect the Devices:** Use the appropriate cables (copper straight-through for PCs to the switch, copper cross-over for switch to router) to connect the devices.

2.Assign IP Addresses:

- Assign private IP addresses (10.10.10.0/20) to the PCs and the router1 internal interface.

- Assign a public IP address (50.50.50/30) to the router1 external interface.

- Assign an IP address to the server that simulates an external network (10.10.10.2).

- Assign private IP addresses (20.20.20.0/20) to the PCs and the router2 internal interface.

- Assign a public IP address (60.60.60/30) to the router2 external interface.
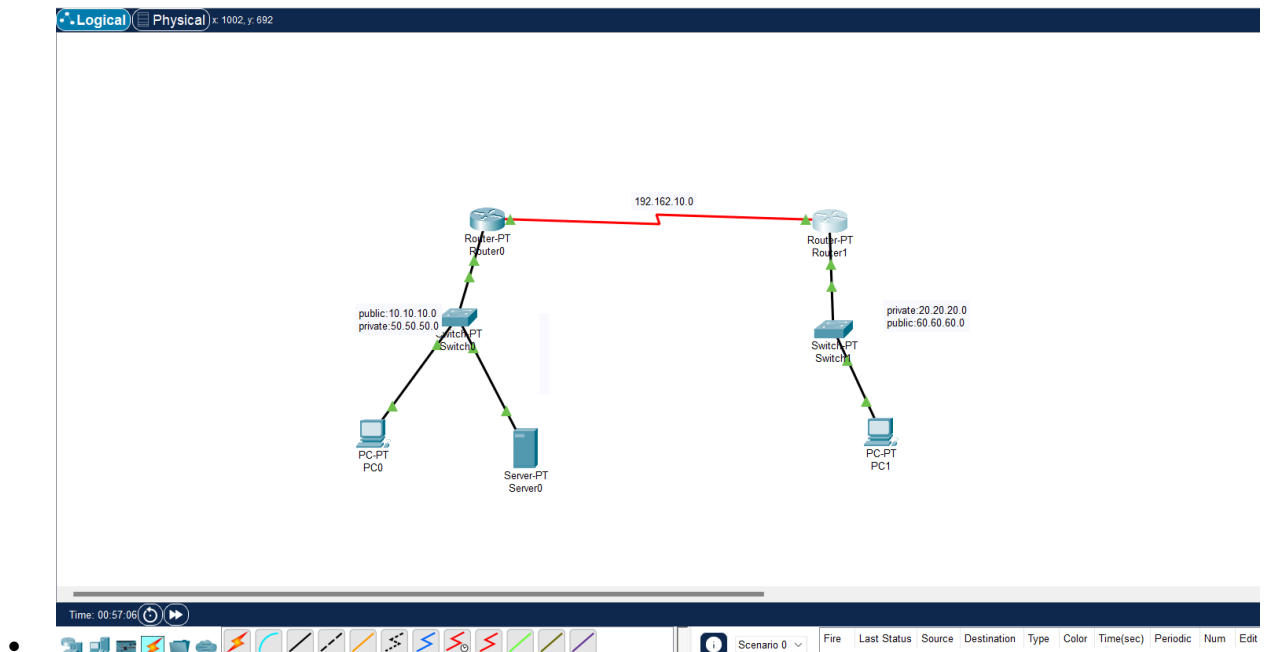
3. Configuring NAT on the Router

- ### Steps:

    1. Access the Router CLI: Click on the router and go to the CLI tab.

    2. Enter Global Configuration Mode:

    ```
    Router>enable
    Router#config
    Configuring from terminal, memory, or network [terminal]?
    Enter configuration commands, one per line.  End with CNTL/Z.
    ```

4.Configure Interfaces:

- Set up the internal and external interfaces
- For router0:

```
Router#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip nat inside source static 10.10.10.2 50.50.50.2
Router(config)#ip nat inside source static 10.10.10.3 50.50.50.2
Router(config)#inte
% Incomplete command.
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface
% Incomplete command.
Router(config)#interface fe
                         ^
% Invalid input detected at '^' marker.

Router(config)#interface fastEthernet 0/0
Router(config-if)#ip nat inside
Router(config-if)#exit
Router(config)#interface serial 2/0
Router(config-if)#ip nat outside
Router(config-if)#interface fastEthernet 1/0
Router(config-if)#ip nat inside
Router(config-if)#exit
Router(config)#ip route 60.0.0.0 255.0.0.0 192.162.10.2
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
```

- For router1:

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 20.20.20.1 255.0.0.0
Router(config-if)#ip address 20.20.20.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#ip address 192.162.10.2 255.255.255.0
Router(config-if)#ip address 192.162.10.2 255.255.255.0
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
```

5.Configure NAT Overload (PAT):

Define an access list to match the internal IP range:

• Configure NAT to translate the internal addresses to the external address.

• This configures PAT (Port Address Translation), which allows multiple internal IPs to

share a single external IP.

```
Router(config)#
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#access-list 1 permit 192.168.1.0 0.0.0.255
Router(config)#ip nat inside source list 1 interface fastethernet 0/1 overload
```

6.Testing NAT:

- 1.Ping from a PC to the External Network:
- From one of the PCs, open the command prompt and try to ping the external server .

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 60.60.60.2

Pinging 60.60.60.2 with 32 bytes of data:

Request timed out.
Reply from 60.60.60.2: bytes=32 time=1ms TTL=126
Reply from 60.60.60.2: bytes=32 time=9ms TTL=126
Reply from 60.60.60.2: bytes=32 time=1ms TTL=126

Ping statistics for 60.60.60.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 9ms, Average = 3ms

C:\>ping 20.20.20.2

Pinging 20.20.20.2 with 32 bytes of data:

Reply from 10.10.10.1: Destination host unreachable.
Reply from 10.10.10.1: Destination host unreachable.
Reply from 10.10.10.1: Destination host unreachable.
Reply from 10.10.10.1: Destination host unreachable.

Ping statistics for 20.20.20.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

-
- On the router CLI, check the NAT translation table to see the active translations:

```
Router#show ip nat translations
```

- **Observe the Output:**
- The NAT translation table should show the mapping of the internal private IP addresses to the external public IP.

7.Setting up message in the server:

- Click on the server and select services.
- In that select the index(edit),then change or add text or paragraph that is required ,then save it.
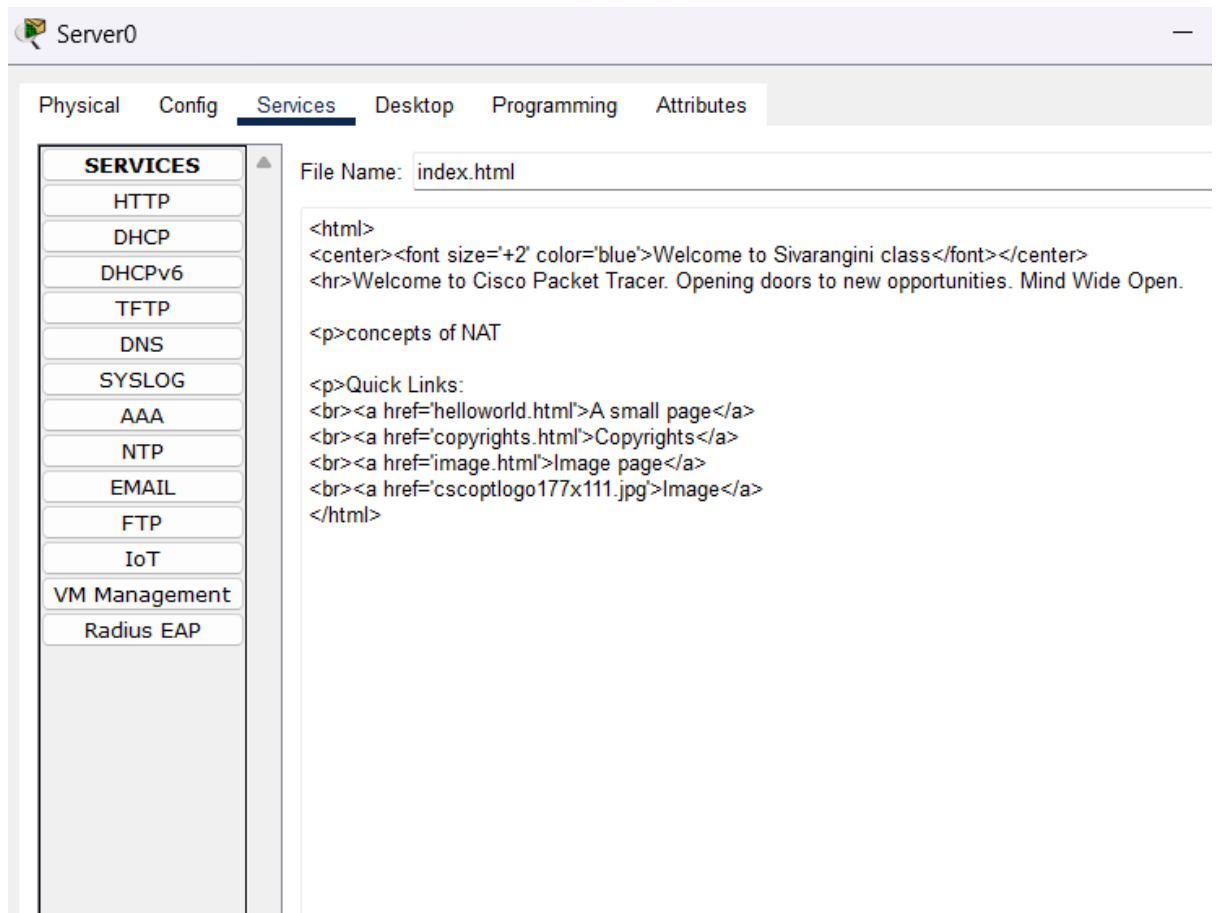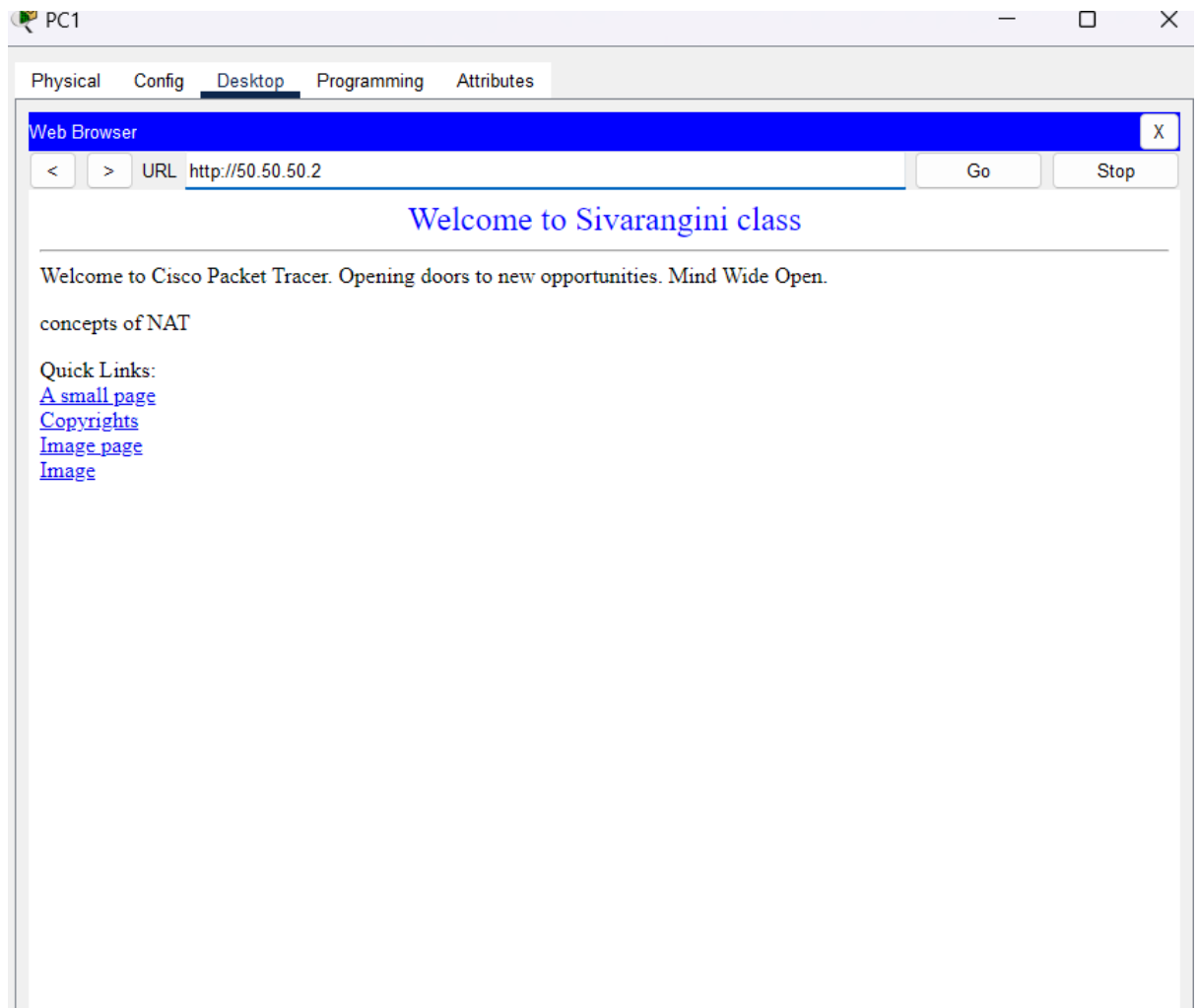
8.Observing the traffic:

• Use the simulation mode in Packet Tracer to visually observe the NAT process as packets move from the internal network to the external network**.**

9.To view the website:

- Click on PC1 and then select desktop ,then click web browser.
- There in the URL type 50.50.50.2 and click Go.
- The following input in the server will be displayed.

PC1   □   ×

Physical   Config   Desktop   Programming   Attributes

Web Browser   X

<   >   URL http://50.50.50.2   Go   Stop

Welcome to Sivarangini class

Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.

concepts of NAT

Quick Links:
A small page
Copyrights
Image page
Image

10.Saving the configuration:

```
Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

Result:

Thus we successfully examined NAT using cisco packet tracer.